EFFECTS OF CIRCUIT TRAINING ON HEALTH RELATED PHYSICAL FITNESS COMPONENTS AMONG B.Ed STUDENTS OF JODHPUR DISTRICT

A Proposal

Submitted to the Partial Fulfillment of award of Doctor of Philosophy
in Physical education under Inter-disciplinary Studies

By

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INTRODUCTION:

Physical fitness is a state of health and well-being and, more specifically, the ability to perform aspects of sports, occupations and daily activities. Physical fitness is generally achieved through proper nutrition, moderate-vigorous physical exercise, and sufficient rest.

Before the industrial revolution, fitness was defined as the capacity to carry out the day's activities without undue fatigue. However, with automation and changes in lifestyles physical fitness is now considered a measure of the body's ability to function efficiently and effectively in work and leisure activities, to be healthy, to resist hypo kinetic diseases, and to meet emergency situations.

For physical fitness activity to benefit an individual, the exertion triggers a response called a stimulus. Exercise with the correct amount of intensity, duration, and frequency can produce a significant amount of improvement. The person may overall feel better, but the physical effects on the human body take weeks or months to notice and possibly years for full development. For training purposes, exercise must provide a stress or demand on either a function or tissue. To continue improvements, this demand must eventually increase little over an extended period of time. This sort of exercise training has three basic principles: overload, specificity, and progression. These principles are related to health but also enhancement of physical working capacity.

Physical fitness has always been important part of life. It is theorized that when people left a hunter-gatherer lifestyle and formed fixed communities based around agriculture that physical fitness levels declined. This is not to say that levels of physical labour decreased but that the type of work undertaken was not necessarily as conducive to a general level of fitness. As such, regimented fitness regimes were

either invented or became more common. This was especially the case in classical civilizations such as Ancient Greece and Rome. In Greece especially physical fitness was considered to be an essential component of a healthy life and it was the norm for men to frequent a gymnasium. Physical fitness regimes were also considered to be of paramount importance in a nation's ability to train soldiers and field an effective military force. Partly for these reasons, organized fitness regimes have been in existence throughout known history and evidence of them can be found in many countries.

Gymnasiums which would seem familiar today began to become increasingly common in the 19th Century. The industrial revolution had led to a more sedentary lifestyle for many people and there was an increased awareness that this had the potential to be harmful for health. This was a key motivating factor for the forming of a physical culture movement, especially in Europe and the USA. This movement advocated increased levels of physical fitness for men, women and children and sought to do so through various forms of indoor and outdoor activity, and education. In many ways it laid the foundations for modern fitness culture.

Specific or task-oriented fitness is a person's ability to perform in a specific activity with a reasonable efficiency: for example, sports or military service. Specific training prepares athletes to perform well in their sport.

Circuit training is very time efficient which makes it a popular method of training. It is an excellent way to improve cardiovascular fitness and muscular strength endurance. Circuit training will elevate your heart rate and keep it high through the entire circuit due to the short rest periods, large muscles being worked together and a combination of upper, lower and whole body exercise.

Circuit training is best used by intermediate trainees who have already established good technique with a wide variety of exercise and a baseline level of strength and fitness.

NEED AND IMPORTANCE OF RESEARCH:

Teens, both male and female, should give importance to their physical fitness, as it helps in the growth and development of their body. Today, most teens lack

physical activity, which results in slowing down of their metabolic processes. As a result, obesity among them is increasing at a rapid rate. When they gain a lot of weight, it can affect them, both physically and psychologically. They may find it difficult to move around, run or play in a free manner like other young people. This makes keeping themselves physically fit will help them look attractive, feel good about themselves, and enable them to work smartly. Physical activity is important for building and maintenance of healthy muscles, bones, and joints. It helps in making the body more flexible and increases the strength and endurance of the muscles. It also reduces unwanted body fat and helps to keep a check on the body weight. Physical activities like sports and exercises are required to keep the body fit, be mentally healthy, get rid of depression and frustration, and improve one's self-esteem.

When children become teenagers, they experience many physical changes with their bodies. As teens hit puberty, they will gain weight and grow in height. While health is important throughout one’s entire life, focusing on physical health in teens is especially important. If teenagers stay physically fit and active, they can avoid health problems and other complications in the future required to fit in the right amount of physical activity. Many everyday tasks can count as physical activity for teenagers. Staying active can reduce the likelihood of obesity and other weight related problems. Combining physical fitness with a healthy diet can also reduce the risk of heart disease and increase the life span of health individuals. There are dozens of different physical activities that teenagers can partake in at school, at home and with friends.

1. Muscular Strength:

Muscular Strength is the amount of force you can put forth with your muscles. It is often measured by how much weight you can lift. People with strength have fewer problems with backaches and can carry out their daily tasks efficiently. Examples of muscular strength include push-ups, weight lifting heavy weight with few repetitions, and pull-ups. Fitness testing will be measured by doing push-ups. (https://www.randall.k12.wi.us/cms/lib/WI01001877/Centricity/Domain/52/Fitness%20Focus.pdf)

2. Muscular Endurance:

Muscular Endurance is the ability to use the muscles, which are attached to the bones, many times without getting tired. People with good muscular endurance are likely to have better posture, have fewer back problems, and be better able to resist fatigue than people who lack muscular endurance. You can improve muscular endurance by lifting weights with many repetitions or doing sit-ups. Measuring the number of sit-ups you can do correctly is used for fitness testing. (https://www.randall.k12.wi.us/cms/lib/WI01001877/Centricity/Domain/52/Fitness%20Focus.pdf)

3. Cardiovascular Endurance:

Cardiovascular endurance (also known as cardio respiratory endurance or aerobic fitness) refers to your body's ability to efficiently and effectively intake oxygen and deliver it to your body's tissues by way of the heart, lungs, arteries, vessels, and veins. By engaging in regular exercise that challenges your heart and lungs, you can:

- Maintain or even improve the efficient delivery and uptake of oxygen to your body's systems
- Enhance cellular metabolism
- Ease the physical challenges of everyday life

4. Flexibility:

To some degree, your flexibility determines the efficiency of your muscles. Increased flexibility has also been associated with decreased risk of acute and chronic (overuse) injuries.

Poor flexibility can directly affect cardiovascular endurance, muscle strength, and muscular endurance. Physiologically, flexibility can include extra muscular factors, such as range of motion at a joint, as well as intramuscular factor, such as hyper tonicity (knots) within the muscles themselves.

5. Body Mass Index:

Though BMI has limitations, it is an important measurement tool. It's a rough indicator of current health status and disease risk, based upon weight and degree of

obesity. The American Cancer Institute says an abnormal BMI (overweight) in women with breast cancer is associated with lower survival rates; and according to the American Heart Association, as BMI during childhood climbs, so does the risk of coronary heart disease in adulthood. Additionally, as BMI rises above 25, both blood pressure and cholesterol increase while high-density lipoprotein (HDL) or "good" cholesterol decreases.

STATEMENT OF PROBLEM:

The research scholar was interested to undertake the study stated as"Effects of circuit training on health related physical fitness components among B.Ed. students of Jodhpur district."

OBJECTIVE OF STUDY:

- To measure the effects of circuit training on health related physical fitness components of experimental group and control group of B.Ed. students in Jodhpur district.
- To compare the effects of circuit training on health related physical fitness components of experimental group and control group of B.Ed. students in Jodhpur district.

HYPOTHESIS OF THE STUDY:

- There will be significant improvement on the Muscular Strength of B.Ed. Students of Jodhpur District due to circuit training.
- There will be significant improvement on the Muscular Endurance of B.Ed. Students of Jodhpur District due to circuit training.
- There will be significant improvement on the Cardiovascular Endurance of B.Ed. Students of Jodhpur District due to circuit training.
- There will be significant improvement on the Flexibility of B.Ed. Students of Jodhpur District due to circuit training.
- There will be significant improvement on the Body Mass Index of B.Ed. Students of Jodhpur District due to circuit training.

LIMITATION OF THE STUDY:

The present study will have the following limitations:

- No specific motivation and technique was used during the test.
- The family background of the students was not be taken into consideration.
- In this study cast, religious, color of the students was not be taken into consideration.
- In this study life style of the students was not be considered.
- Background of the subject was unknown to the research scholar.
- Inherent potentiality of the subjects was not considered.
- During test weather and environment are also limited.

DELIMITATION OF THE STUDY:

Delimitation is the process of fixing the boundaries of the research area. These are as follows.

- The study will be delimited to students of Jodhpur district.
- The study will be delimited to B.Ed. students.
- Only 100 students, 50 from each group.
- The age group of the subjects is ranged between 21-28years.
- The study will be delimited to the selected health related physical fitness components:
    - Muscular Strength
    - Muscular Endurance
    - Cardiovascular Endurance
    - Flexibility
    - Body mass index

DEFINITION OF TERMS:

Physical Fitness: - Physical fitness is the relative state of optimal function. All humans are able to be active because of the physiology / function of multiple body systems. Each of us has an optimal function which is unique to us and based largely on genetic endowment. We can improve that function by systematically engaging in various activities. The term relative is comparative in nature and so we may be more or less fit than we were or more or less fit than others with similar genetic endowment.

Health Related Physical Fitness: - According to the President's Council on Physical Fitness (PCPFS), "Health-related physical fitness consists of those components of physical fitness that have a relationship with good health."

Circuit Training: - Circuit training is a form of body conditioning or endurance training or resistance training using high- intensity aerobics. It targets strength building and muscular endurance. An exercise "circuit" is one completion of all prescribed exercise in the program. When one circuit is complete, one begins the first exercise again for the next circuit.

Muscular Endurance: - Muscular endurance is defined as the ability of the body to perform repeated exercises without getting tired. If a person can perform more number of repetitions of a particular strength training exercise, then it can be said that he/she has good muscular endurance.

Endurance training exercises such as running, jogging, cross-training on an elliptical machine, etc.

Muscular Strength: - Muscle strength can be defined as the capability of the muscles to lift weight. By doing weight training exercises every alternate day increases the muscle mass of the body.
Weight training exercises – pushups, pull ups, biceps curls, pectoral fly, leg extensions, back extension, etc. (www.health-galaxy.com)

Cardiovascular Endurance: - Cardiovascular endurance can be defined as the component which helps to determine if the heart and lungs are working in coordination. It shows the ability of the body to deliver oxygen and nutrients to tissues and to remove wastes.

Cardiovascular exercises -walking, running, biking, rowing, treadmills

Flexibility: -Flexibility is the ability of a joint to move freely through its range of motion (ROM). Gymnastic events require substantial joint flexibility. Various methods of stretching can increase flexibility. The sit and reach test is the most common way to measure lower back and hamstring flexibility .

Because tightness in the low back and hamstrings is often related to muscle pain and stiffness, this test may help determine a person's risk for future pain and injury. It has been used by exercise physiologists and fitness trainers for decades to assess baseline flexibility before starting an exercise program and is repeated after several weeks to determine progress. (www.sports-training-adviser.com)

Body Mass Index: The body mass index provides an indication of appropriateness of weight and height. The body mass index may be defined as the ration of body weight and the square of height in meter.

B.Ed. Students: Students who are studying for B.Ed. of college in Jodhpur district age group between 21 to 28.

REVIEWS RELATED TO RESEARCH STUDY:

Cattuzzo,M.T.at(2014Dec12), Motor competence and health related physical fitness in youth: A systematic review.

OBJECTIVES: This study aimed to review the scientific evidence on associations between motor competence (MC) and components of health related physical fitness (HRPF), in children and adolescents.

DESIGN: Systematic review.

METHODS: Systematic search of Academic Search Premier, ERIC, Pub Med, PsycInfo, Scopus, Sport Discus, and Web of Science databases was undertaken between October 2012 and December 2013. Studies examining associations between MC and HRPF components (body weight status, cardio respiratory fitness, musculoskeletal fitness and flexibility) in healthy children and adolescents, published between 1990 and 2013, were included. Risk of bias within studies was assessed using CONSORT and STROBE guidelines. The origin, design, sample, measure of MC, measure of the HRPF, main results and statistics of the studies were analyzed and a narrative synthesis was conducted.

RESULTS: Forty-four studies matched all criteria; 16 were classified as low risk of bias and 28 as medium risk. There is strong scientific evidence supporting an inverse association between MC and body weight status (27 out of 33 studies) and a positive association between MC and cardio respiratory fitness (12 out of 12 studies) and musculoskeletal fitness (7 out of 11 studies). The relationship between MC and flexibility was uncertain.

CONCLUSIONS: Considering the noted associations between various assessments of MC and with multiple aspects of HRPF, the development of MC in childhood may both directly and indirectly augment HRPF and may serve to enhance the development of long-term health outcomes in children and adolescents.

VanhelstJ, Béghin,L.at(2014Nov-Dec), [BOUGE-fitness test battery: health-related field-based fitness tests assessment in children and adolescent]

Physical fitness is an important determinant of global health in children and adolescents. Key components of physical fitness include cardio respiratory fitness, flexibility, speed, and muscular and endurance strength. The school environment provides a great opportunity to assess the physical fitness level in children and adolescents. The French national program "Bouge... Une priorité pour at santé! "(Move ... A priority for your health!) Aims to assess the physical fitness of children and adolescents aged 6 to 18 years old in French schools. The aim of this paper is to describe the interest to assess different health-related physical fitness components. It presents the chosen tests within said battery for children and adolescents and explains how the battery was conceived. Their validity, reliability, low the health-related physical fitness tests included in "BOUGE" were chosen for cost and feasibility for all schools.

Vanhelst J[1], Béghin L, Fardy PS, Ulmer Z, Czaplicki G.(2014 Oct 16), Reliability of health-related physical fitness tests in adolescents: the MOVE Program.

Abstract: The aim was to examine the reliability of health-related physical fitness tests that were used in a French health promotion program 'Move…A priority for your health'. Participants were 174 French youth (88 children and 86 adolescents) aged 8·2-16·2 years. Aerobic fitness, muscular strength, speed and flexibility were tested using 20-m shuttle run test, ½ mile run test, basketball throw, standing long jump, shoulder stretch and 20/30/50-m sprint tests. Reliability was calculated for the basketball throw, standing long jump, and shoulder stretch and sprint tests. The tests were performed two times, 1 week apart on the same day of the week. Reliability was examined with interclass correlation coefficients (ICCs) and Bland-Altman analysis. With the exception of the ½ mile run test, which resulted in moderate agreement (0·66), all tests had high reliability. ICCs were 0·97, 0·93, 0·91 and 0·93 for the sprint test, basketball throw, shoulder stretch and the standing long jump, respectively. The differences obtained between the first and the second trial was non-significant. Results from this study indicate

that the BOUGE health-related physical fitness battery, administrated by physical education teachers, was reliable for measuring health-related components of fitness in children and adolescents in a school setting.

De Miguel-Etayo P[1] at (2014 Sep), Physical fitness reference standards in European children: the IDEFICS study.

OBJECTIVES:A low fitness status during childhood and adolescence is associated with important health-related outcomes, such as increased future risk for obesity and cardiovascular diseases, impaired skeletal health, reduced quality of life and poor mental health. Fitness reference values for adolescents from different countries have been published, but there is a scarcity of reference values for pre-pubertal children in Europe, using harmonized measures of fitness in the literature. The IDEFICS study offers a good opportunity to establish normative values of a large set of fitness components from eight European countries using common and well-standardized methods in a large sample of children. Therefore, the aim of this study is to report sex- and age-specific fitness reference standards in European children.

SUBJECTS/METHODS: Children (10,302) aged 6-10.9 years (50.7% girls) were examined. The test battery included: the flamingo balance test, back-saver sit-and-reach test (flexibility), handgrip strength test, standing long jump test (lower-limb explosive strength) and 40-m sprint test (speed). Moreover, cardio respiratory fitness was assessed by a 20-m shuttle run test. Percentile curves for the 1st, 3rd, 10th, 25th, 50th, 75th, 90th, 97th and 99th percentiles were calculated using the General Additive Model for Location Scale and Shape (GAMLSS).

RESULTS: Our results show that boys performed better than girls in speed, lower- and upper-limb strength and cardio respiratory fitness, and girls performed better in balance and flexibility. Older children performed better than younger children, except for cardio respiratory fitness in boys and flexibility in girls.
CONCLUSIONS: Our results provide for the first time sex- and age-specific physical fitness reference standards in European children aged 6-10.9 years.

Brusseau TA, (2014 Jun), Health-related fitness of American Indian youth.

A physically fit lifestyle is important for American Indian (AI) youth who are at risk for hypo kinetic diseases, particularly type 2 diabetes. Some evidence exists on the physical activity patterns of AI youth, but there is little information on their health-related fitness.

PURPOSE: The purpose of this study was to describe the health-related fitness levels of youth living in an AI community.
METHOD: Participants included youth from 5th to 9th grade (N = 85) in a Southwestern U.S. AI community. Youth were of AI descent and were 12.36 +/- 1.68 years of age. Participants completed 5 parts of the FITNESSGRAM fitness test during physical education. The tests included the Progressive Aerobic Cardio respiratory Endurance Run fitness test (cardiovascular fitness), curl-up (muscular endurance), pushup (muscular strength), sit-and-reach (flexibility), and body mass index (estimated body composition).
RESULTS: Results were similar to other youth studies with some of the students reaching the healthy fitness zone for muscular strength (28%), body composition (30%), flexibility (60%), aerobic fitness (63%), and muscular endurance (74%).
CONCLUSIONS: Findings highlight the capacity for improvement for students across all of the components of health-related fitness.
http://www.ncbi.nlm.nih.gov/pubmed/25098022

Grande AJ[1], Silva V[1], Parra SA[2]. (2014 Jan-Mar), Effectiveness of exercise at workplace in physical fitness: uncontrolled randomized study.

OBJECTIVE: To investigate the effectiveness of workplace exercise for employee health by means of health-related physical activity components.
METHODS:A randomized uncontrolled study with 20 workers was carried out during three months to evaluate a workplace exercise program. The selected outcomes were flexibility, body mass, fat percentage, lean mass, blood pressure, and heart rate. For statistical analysis, the paired t test and the intent-to-treat analysis were used.
RESULTS: There was a significant increase in weight, fat percentage, blood pressure, and heart rate. However the clinical significance was 10% in the size of the effect.
CONCLUSION: The changes verified in the outcomes analyzed were not significant; the variables are within normality ranges proposed by academic organizations. .

Cieśla E[1], Mleczko E[2]at (2014), Health-Related Physical Fitness, BMI, physical activity and time spent at a computer screen in 6 and 7-year-old children from rural areas in Poland.

The objective of the study was determination of the effect of various forms of physical activity, BMI, and time devoted to computer games on the level of Health-Related Physical Fitness (H-RF) in 6-7-year-old children from Polish rural areas. The study covered 25,816 children aged 6-7: 12,693 girls and 13,123 boys. The evaluations included body height and weight, and 4 H-RF fitness components (trunk strength, explosive leg power, arm strength and flexibility). The BMI was calculated for each child. The Questionnaire directed to parents was designed to collect information concerning the time devoted by children to computer games, spontaneous and additional physical activity. The strength of the relationships between dependent and independent variables was determined using the Spearman's rank correlation (RSp), and the relationship by using the regression analysis. The BMI negatively affected the level of all the H-RF components analyzed (p=0.000). The negative effect of computer games revealed itself only with respect to flexibility (p=0.000), explosive leg power (p=0.000) and trunk muscle strength (p=0.000). A positive effect of spontaneous activity was observed for flexibility (p=0.047), explosive leg power (p=0.000), and arm strength (p=0.000). Additional activity showed a positive relationship with trunk muscles strength (p=0.000), and explosive leg power (p=0.000). The results of studies suggest that it is necessary to pay attention to the prevention of diseases related with the risk of obesity and overweight among Polish rural children as early as at pre-school age. There is also a need during education for shaping in these children the awareness of concern about own body, and the need for active participation in various forms of physical activity. **(**http://www.ncbi.nlm.nih.gov**)**

Elżbieta Cieśla1, at (2014), Health-Related Physical Fitness, BMI, physical activity and time spent at a computer screen in 6 and 7-year-old children from rural areas in Poland

The objective of the study was determination of the effect of various forms of physical activity, BMI, and time devoted to computer games on the level of Health-Related Physical Fitness (H-RF) in 6–7-year-old children from Polish rural areas. The study covered 25,816 children aged 6–7: 12,693 girls and 13,123 boys. The evaluations included body height and weight, and 4 H-RF fitness components (trunk strength, explosive leg power, arm strength and flexibility). The BMI was calculated for each child. The Questionnaire directed to parents was

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Cuenca-Garcia M[1], (2013 Nov-Dec), Clustering of multiple lifestyle behaviors and health- related fitness in European adolescents.

OBJECTIVE: To explore the clustering of different lifestyle behaviors and whether this clustering differs by gender, age, and health-related fitness.
DESIGN: Healthy Lifestyle in Europe by Nutrition in Adolescence (HELENA) cross-sectional study.
SETTING: Ten European cities.
PARTICIPANTS: A total of 2,084 adolescents (12.5-17.5 years).
MAIN OUTCOME MEASURES: Four lifestyle behaviors were assessed by self-administered questionnaires: moderate to vigorous physical activity, homework time, screen time, and diet. Health-related fitness components (aerobic capacity, strength, speed-agility, and body composition) were assessed.
ANALYSIS: Hierarchical method and κ-means cluster analysis. Analysis of variance tests.
RESULTS: Five clusters were identified: Healthy diet and Active, Healthy diet and Academic, Healthy diet and Inactive, Unhealthy diet and Screen user, and Unhealthy diet and Active. Younger adolescents were more active and followed a healthier diet than older adolescents. Older boys devoted more time to screen use, whereas older girls devoted more time to homework. Boys in the Healthy diet and Active cluster presented higher aerobic capacity and speed-agility, whereas girls presented higher aerobic capacity, strength, and speed-agility.

CONCLUSIONS AND IMPLICATIONS: Clustering of different lifestyle behaviors is observed. Different healthy lifestyles do not always come together and clusters are associated with gender, age, and health-related fitness, but not with body composition. These differences need to be considered when developing intervention strategies for the prevention of unhealthy.
http://www.ncbi.nlm.nih.gov/pubmed/23702476

Bass RW[1], Brown DD, Laurson KR, Coleman MM. (2013 Aug),Physical fitness and academic performance in middle school students.

AIM: The purpose of this study was to determine whether physical fitness is linked to academic success in middle school students.

METHODS: The FITNESSGRAM test battery assessed students (n = 838) in the five components of health-related fitness. The Illinois Standardized Achievement Test (ISAT) was used to assess academic achievement in reading and math.
RESULTS: The largest correlations were seen for aerobic fitness and muscular endurance (ranging from 0.12 to 0.27, all $p < 0.05$). Boys in the Healthy Fitness Zone (HFZ) for aerobic fitness or muscular endurance were 2.5-3 times more likely to pass their math or reading exams. Girls in the HFZ for aerobic fitness were approximately 2-4 times as likely to meet or exceed reading and math test standards.
CONCLUSIONS: Aerobic capacity and muscular endurance seem to positively affect academic achievement in middle school students. .
http://www.ncbi.nlm.nih.gov/pubmed/24728247

Nathalie de Almeida Silva (Mar. /Apr. 2013), Handgrip strength and flexibility and their association with anthropometric variables in the elderly

OBJECTIVE: To verify the correlation between handgrip strength (HGS) and flexibility with age and anthropometric variables in the elderly.
METHODS: This was a cross-sectional home-based study of elderly individuals enrolled in the Family Health Strategy of Campina Grande/PB. Gender, age, HGS, flexibility, arm muscle circumference (AMC), corrected arm muscle area (CAMA), and body mass index (BMI) were recorded.
RESULTS: A total of 420 elderly individuals were evaluated. Correlations of HGS with age, AMC and CAMA, in both genders, were observed. BMI correlated

with HGS only in females. Flexibility correlated with BMI in males. In the multivariate analysis, age and AMC were predictive variables of the HGS variation in females. In males, age was the only variable predictive of HGS, and BMI was the predictor of flexibility variation.
CONCLUSION: The results indicate a probable influence of age and anthropometric variables in muscular strength, as well as that of excess weight in flexibility limitation. http://dx.doi.org/10.1016/j.ramb.2012.10.002

Manmeet Gill*, at (2010), Comparative Study of Physical Fitness Components of Rural an Urban Female Students of Punjabi University, Patiala
In the present study, an attempt has been made to compare physical fitness components namely speed Strength, endurance, agility and flexibility between female students belonging to rural and urban set-ups. The study was carried out on 100 female students, 50 rural and 50 urban of Punjabi University, Patiala. The data was collected by use of measurements of height and weight as well as by application of tests like jumping, stepping, running, flexibility tested. The data was analyzed and compared with the help of statistical procedures in which arithmetic mean, standard deviation (S.D.), standard error of mean (SEM), t-test were employed. Rural female students were found to be superior In strength, endurance, speed and agility. Urban female students on the other hand, were found to be heavier and Superior in tasks like flexibility.
https://www.google.co.in/webhp?sourceid=chrome-instant&ion

Kwok-Kei Mak1 (2010), Health-related physical fitness and weight status in Hong Kong adolescents

Background: This study was designed to investigate the relation between health-related physical fitness and weight status in Hong Kong adolescents.

Methods: 3,204 students aged 12-18 years participated in the Hong Kong Student Obesity Surveillance (HKSOS) project in 2006-2007. Anthropometric measures (height, weight) and health-related fitness (push-up, sit-up, sit-andreach.9-minute run) were assessed. Body mass index (BMI) was computed to classify participants into normal weight, underweight (Grade I, II/III), overweight, and obese groups. The associations of health-related physical fitness with BMI and weight status were examined by partial correlation coefficients and analysis of covariance, respectively.

Results: More boys than girls were overweight or obese (18.0% vs. 8.7%), but more girls than boys were
Underweight (22.3% vs. 16.7%). Boys performed significantly (P < 0.001) better in sit-up (38.8 vs. 31.6 times/min) and9-minute run (1632.1 vs 1353.2 m), but poorer in sit-and-reach (27.4 vs 32.2 cm) than girls. All four physical fitness tests were significantly positively correlated with each other in both sexes, and BMI was only weakly correlated with sit up and sit-and-reach tests in boys. Decreasing performance (P for trend < 0.05) was observed from normal weight to overweight and obese for push-up, sit-up, and 9-minute run in both sexes. From normal weight to Grade I and Grade II/III underweight, decreasing performance (P for trend < 0.05) for sit-up and sit-and-reach in both sexes and for push-up in boys was observed.
Conclusions: The relations between BMI and health-related physical fitness in adolescents were non-linear. Overweight/obese and underweight adolescents had poorer performance in push-up and sit-up tests than normal weight adolescents. Different aspects of health-related physical fitness may serve as immediate indicators of potential health risks for underweight and overweight adolescent.
http://www.biomedcentral.com/1471-2458/10/88

METHODOLOGY:

Experimental Research.

Two group Equivalent sample per-post research design.

POPULATION AND SAMPLE:

The data pertaining to this study were collected from the B.Ed. Students of Jodhpur district. This student selected through purposefully sample method and researcher selects the 100 subjects, 50 from each group.

RESEARCH DESIGN:

The design in a research study refers to "the researcher's overall plan for answering the researcher's question or testing the research hypotheses". This study

involves a cross sectional, comparative pre, mid and post-test of two groups of B.Ed. students in an experimental research. Since only experimental group will be taken by the investigator and there will be no control group so this study will be conducted in a quasi-square experimental design. This explores and measures the health related physical components within the environment and culture. Ultimately, the findings will increase the awareness of physical education regarding universal health and enhance the quality of health care in country

TOOLS OF DATA COLLECTION:

The following criterion measures were chosen for testing the hypothesis.
Physical Fitness Variables measures were:-

Muscular Strength: Pull-ups
Objective: To measure the muscular strength of the arms and shoulders muscles.
Equipment: Chin up Bar

Procedure: Grasp the overhead bar using either an overhand grip (palms facing away from body) or underhand grip (palms facing toward body), with the arms fully extended. The subject then raises the body until the chin clears the top of the bar, then lowers again to a position with the arms fully extended. The pull-ups should be done in a smooth motion. Jerky motion, swinging the body, and kicking or bending the legs is not permitted. As many full pull-ups as possible are performed.

Score: The total number of correctly completed pull-ups is recorded. The type of grip should also be recorded with the results.

Muscular Endurance: Sit-up

Objective: To measures the muscular endurance of the abdominal and hip-flexor muscles.

Equipment: Flat Ground, Stop Watch

Procedure: The aim of this test is to perform as many sit-ups as you can in two minutes. The starting position is lying on your back with your knees bent and feet flat on the floor. The arms are folded across and the chest, and must maintain no gap between the forearms and the chest at all times. A second person is permitted to hold the lower legs or ankles. On the command 'go,' start the crunch by raising your upper body forward until the elbows or forearms touch the thighs, and then lower the torso until the shoulder blades touch the ground. This is one complete sit up.

Scoring: The maximum number of correctly performed sit ups is recorded. Both male and female Marines are awarded one point for every crunch, and a minimum number is required to pass the test. The minimum requirements is the same for males and females, being 50 for those aged 17-26, 45 for those aged 27-45, and 40 crunches for those 46 and over.

Cardiovascular Endurance:12 min. Run and Walk test

Objective:to test aerobic fitness (the ability of the body to use oxygen to power it while running)

Equipment:lat oval or running track, marker cones, recording sheets, stop watch.

Procedure: Place markers at set intervals around the track to aid in measuring the completed distance. Participants run for 12 minutes, and the total distance covered is recorded. Walking is allowed, though the participants must be encouraged to push themselves as hard as they can to maximize the distance covered.

Scoring: There are Cooper test norm tables for general guidelines for interpreting the results of this test for adults. There are also several equations that can be used to estimate VO_{2max} (in ml/kg/min) from the distance score (a formula for either kms or miles):

VO_{2max} = (35.97 x miles) - 11.29
VO_{2max} = (22.35 x kilometers) - 11.29

Flexibility: Sit and Reach Test

Objective: To measure the flexibility of the back and leg (hamstring) muscles.

Equipment: Flex measure and a yardstick.

Procedure: The subject is asked to remove shoes and place his/her feet against the testing box while sitting on the floor with straight knees. Now the subject is asked to place one hand on top of the other so that the middle fingers of both hands are together at the same length. The tester keeps his/her hand on the knees of the subject to keep them straight not allowing any bending of the knees. The subject is instructed to lean forward and place his/her hands over the measuring scale lying on the top of the box with its 10 inch mark coinciding with the front edge of the testing box. Then, the subject is asked to slide his/her hands along the measuring scale as for as possible without bouncing and to hold the farthest position for at least one second.

Score: Each subject is given three trials and the height score nearest to an inch is recorded and 10 inches are subtracted from the recorded reading to obtain the flexibility score.

Body Mass Index: Body fat was measured through the measuring of height and weight.

Body mass index

Height

Weight

Height:

Equipment: Stadiometer

Procedure: The subject is asked stand without shoes. Heels together, back as straight as possible, heels, buttocks shoulder and head touching the vertical ruler and looking straight ahead. Weight should be distributing evenly on both feet arms hanging freely by the sides of the body. Thus the measurement of the subjects in recorded accurate up 0.1 cm is maintained.

Weight:

Equipment: Weighing machine

Procedure: The subject is asked stand erect on the platform of the weighing machine with equal weight on both feet. The weight of subject is usually recorded accurate up to 0.05 Kg. is maintained

The data pertaining to the study was collected by administering the tests for the selected variables. Before collection of data, the subjects was given a chance to practice the prescribed tests so that they should become familiar with the tests and know exactly what is to be done to ensure uniform testing condition the subjects was tested during morning and data was collected.

STATISTICAL TOOLS:

For the analysis of data mean, standard deviations, and ANOVA (LSD Scheffe post hoc test) were used to effects the training programme on five selected components of physical fitness of B.Ed. students in Jodhpur district.

Formula for mean, S.D. and ANOVA are as follow:

$M = \sum X/N$

$S.D = \sqrt{\sum D^2/N}$

ANOVA= there are four steps of ANOVA

REFERENCES:

- Tremblay MS, Colley RC, Saunders TJ, Healy GN, Owen N (December 2010). "Physiological and health implications of a sedentary lifestyle". Applied Physiology, Nutrition, and Metabolism = Physiologie Appliquee, Nutrition et Metabolism. 35 (6): 725–40. *doi*:*10.1139/H10-079*. *PMID 21164543*.
- de Groot GC, Fagerström L (June 2011). "Older adults' motivating factors andbarrierstoexercisetopreventfalls". ScandinavianJournalofOccupationalTherapy. 18 (2):15360. *doi*:*10.3109/11038128.2010.487113*. *PMID 20545467*.
- Malina R (2010). Physical activity and health of youth. Constanta: Ovidius University Annals, Series Physical Education and Sport/Science, Movement and Health.
- "President's Council on Physical Fitness and Sports Definitions for Health, Fitness, and Physical Activity". fitness.gov. Archived from the original on 12 July 2012.
- Blair SN (December 1993). "1993 C.H. McCloy Research Lecture: physical activity, physical fitness, and health". ResearchQuarterlyforExerciseandSport. 64 (4):365-76. doi:10.1080/02701367.1993.10607589. PMID 8278662
- Cattuzzo,M.T**.,**(2014Dec12),Motor competence and health related physical fitness in youth: A systematic review.
- Vanhelst J**,** Béghin, L**,**at (2014 Nov-Dec)[BOUGE-fitness test battery: health-related field-based fitness tests assessment in children and adolescent] .
- Vanhelst [J1], Béghin L, Fardy PS, Ulmer Z, Czaplicki G. (2014 Oct 16) Reliability of health-related physical fitness tests in adolescents: the MOVE Program.
- De Miguel-Etayo P,at (2014 Sep), Physical fitness reference standards in European children: the IDEFICS study.
- Brusseau TA**,** (2014 Jun),Health-related fitness of American Indian youth.
- Grande AJ**[1],** Silva V**[1],** Parra SA**[2].** (2014 Jan-Mar).Effectiveness of exercise at workplace in physical fitness: uncontrolled randomized study.
- Cieśla E[1], Mleczko E[2,] at (2014),Health-Related Physical Fitness, BMI, physical activity and time spent at a computer screen in 6 and 7-year-old children from rural areas in Poland.

- Elżbieta Cieśla1,at (2014), Health-Related Physical Fitness, BMI, physical activity and time spent at a computer screen in 6 and 7-year-old children from rural areas in Poland
- Cuenca-Garcia M[1], (2013 Nov-Dec), Clustering of multiple lifestyle behaviors and health- related fitness in European adolescents.
- Bass RW[1], (2013 Aug),Brown DD, Laurson KR, Coleman MM.Physical fitness and academic performance in middle school students.
- Nathalie de Almeida Silva,(Mar./Apr. 2013),Handgrip strength and flexibility and their association with anthropometric variables in the elderly
- Manmeet Gill*,(2010), Comparative Study of Physical Fitness Components of Rural an Urban Female Students of Punjabi University, Patiala
- Kwok-Kei Mak1, (2010), Health-related physical fitness and weight status in Hong Kong adolescents
- Laura Williams, (April 29, 2019), Health-Related Components of Fitness Your blueprint for developing a healthy exercise routine.

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